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ON CATARACT EXTRACTION WITHOUT IRIDECTOMY

BY

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DAVIEL'S method of extraction—*i. e.*, the "simple method," without iridectomy, has of late been revived and recommended with particular emphasis by French oculists, Galezowski, De Wecker, Panas, and others. Thus far, it has found only a small number of advocates outside of France, yet what I saw of it in Paris last winter, impressed me so favorably that I determined to give the method a fair trial. In order to learn what was known and thought about it in this country, I brought it before the American Ophthalmological Society in July, 1886. At that time my experience with it comprised only six operations. Dr. H. D. Noyes reported on six others, and Dr. Grüning on two. Both gentlemen had witnessed the operation in Paris.

My present communication is based on twenty-nine successive cases—including the six mentioned above—in which I succeeded in extracting the lens without exsecting the iris, and on six cases in which I attempted to do so but did not succeed. Our French confrères have described the method in general and in detail. They claim that they have practised it in hundreds of cases, and that the results have been excellent, superior to Graefe's or any other method, but they have given us no detailed and conclusive statistics. Statistics have their fallacies, they are never entirely objective, always bearing more or less of a personal

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stamp, yet they give us a better insight into our own as well as another's work than we can obtain from general descriptions, which reflect only our impressions and opinions for the time being. When we think more or less favorably of a method, we are very apt to overlook, forget, or reason away what is adverse to it. Statistics, if we are honest to ourselves, hold up hard facts that often astonish us. I consider it a decided advantage that some of the larger ophthalmic institutions in this country, for instance, the N. Y. Eye and Ear Infirmary and the Massachusetts Charitable Eye and Ear Hospital, publish in their annual reports detailed statistics of that most important of eye operations, the extraction of cataract. From this point of view I have compiled in tabular form the twenty-nine cases of the operation under consideration, so that all may draw their own deductions therefrom. See table, page 56, etc.

I now beg leave to discuss the subject in its various practical bearings.

1.—Preparation of the Patient.

No patient was operated on the day of entrance into the hospital. They were all kept in the hospital one or more days, in order to have their eyes thoroughly clean and free from irritation. The eyes were washed with soap every morning and evening, and Panas' antiseptic (biniodide of mercury, 0.05 ; alcohol, 20.00 ; dist. water, 1000.00) was instilled several times daily.

Only one patient was operated in the new *operating-room* of the Institution, which was built in the closest possible adherence to bacteriological principles. From the operating room the patient, with bandaged eyes, was led up one flight of stairs. The next day I found he had extensive prolapse of the iris, although the pupil after the operation had been perfectly round and central. He was restless the first twenty-four hours. I do not know how far the moving of the patient was to blame for the prolapse, but I have operated on all others in their bedrooms, where an operating-chair and a drop-light were always on hand. In Paris I have seen that the patients are operated in operating-rooms,

No.	Name.	Age.	Character of cataract.	Complication.	Date of operation.	Operation.	Reduction of iris.	Healing process.
1	M. Don.	76	Hard.		June 10, '86.	Regular.	Spontaneous.	Plastic iritis.
2	A. Balf.	36	Soft.	Od. white.	11	"	"	
3	M. Cam.	55	Hard.		14	"	"	
4	M. Cas.	60	"		21	"	"	Plastic iritis.
5	C. Woods.	63	"		21	"	"	" "
6	M. Bey.	52	"		July 9	"	With probe.	
7	J. Mar.	65	" Not quite ripe.		26	"	Spont.	
8	E. Mull.	52	Hard.		27	Small piece of cortex scooped out with spatula.	"	
9	O. Dem.	40	Hypermature.		Aug. 13	Regular.	"	
10	H. Alb.	57	Hyperm.	Dacryocystitis.	Sept. 20	Considerable manipulation and introduction of instruments. Rigorous antisepsis.	Stroked back.	Striped keratitis. Pupil partially occluded by thickened capsule.
11	L. Scott.	76	Hyperm. black.	Myopia; liquid vitreous.	22	Thickened capsule removed with forceps. Lens expelled by rotating on horizontal axis. Lower edge escaped first.	Spontaneous. Pupil round.	Very restless patient, throwing himself spasmodically about in his bed at night. Had to be watched and tied.
12	Fr. Müll.	61	Hard.			Regular.	With probe.	
13	M. Wallace.	70	"		Oct. 2	"	" "	
14	Mrs. J. Pretorius.	64	Hyperm.		9	Escape of vitreous after expulsion of lens.	" "	The folded iris left an irregular pupil. Healing good.
15	J. Duffy.	63	Hard.		9	Regular.	Spont.	
16	Mrs. Jones.	67	"		19	"	With spatula.	
17	Mrs. Mills.	67	Morgagnian cholesterinic.	F contracted below.	27	Nucleus rubbed out in pieces. The deaf and uncontrollable patient had to be etherized	To stroke the iris back.	Next days cotton moist, edges of wound white, ant. chamber cloudy, iris dull. Careful cleansing with Panas' solution. Gradual clearing up.
18	Kigg.	70	Hard.	Mac. corneæ and dacryocystit. chronic.	Nov. 1	Regular. Pupil apparently clear. Panas' sol. injected in ant. chamb.	Spont.	From pupillary area a shred of capsule passed over iris to nasal corner of wound. Closure of wound normal; pupil round; but pain and circumcorneal injection and swelling, and cloudiness of pupil for a long time. The shred of capsule shrank from periphery and finally disappeared.
19	Sauter.	64	Hard.		13	Regular.	Spont.	
20	Murr.	40	Semimollis.		Nov. 13	Regular.	Spont.	
21	McLaughl.	40	Traumatic.	Small foreign body in eye.	16	Cortex left.	"	

Iris prolapse or incarceration.	Post. synech.	Length of treatment in days.	Primary result.	After operation.	Ultimate result.	Remarks.
	Numerous.	23	$\frac{10}{200}$		$\frac{20}{10}$ (eight mos.)	
		16	$\frac{15}{200}$		$\frac{6}{200}$	Atrophy of od five years. Other eye less, but S $\frac{15}{200}$ only.
		21	$\frac{20}{100}$		$\frac{20}{20}$ six mos.	
	Moderate.	17	$\frac{20}{100}$			
	"	25	$\frac{20}{100}$		$\frac{20}{\text{t}}$ eight mos.	Pupil partially obstructed by capsule. Fundus distinct.
		14	$\frac{20}{70}$		$\frac{20}{30}$	Pupil round, free, partially obstructed by capsule.
		12	$\frac{20}{200}$	Discission five weeks later.	$\frac{20}{70}$	
	Three filiform.	16	$\frac{20}{100}$		$\frac{20}{10}$ eight mos. (not fluently.)	Od surrounded by atrophic band on nasal side.
		13	$\frac{20}{70}$			Isinglass plaster applied on fourth day. Preferred old bandage.
Iris extensively incarcerated. Pupil drawn up, round.	Numerous.	28	$\frac{20}{100}$	Discission four months later.	$\frac{20}{30}$	Old dacryocystitis discharging muco-pus, from which a good cultivation of staphylococcus pyogenes aureus was obtained
Prolapse of iris from second day. Slow but good closure of wound.		35	$\frac{20}{100}$			Prolapse permanent, but free from irritation. Eyes greatly sunken in orbits.
	Two or three filiform adhesions.	14	$\frac{20}{200}$			
	Three filiform adhesions.	22	$\frac{20}{70}$			
No incarceration.		27	$\frac{20}{200}$		$\frac{20}{100}$ four mos.	Unmanageable patient. Pupil and fundus clear; astigmatism. Pupil eccentric; no prolapse.
		23	$\frac{20}{100}$	Discission seven weeks later.	$\frac{20}{30}$	
		17	$\frac{20}{70}$			
Prolapse from second day; disappearing later, leaving eccentric pupil.	Numerous.	26	$\frac{5}{100}$		$\frac{10}{200}$	In secretion at edge of wound micrococci and bacilli found under microscope; grew and liquefied gelatine like staphylococc. pyogenes.
		33	$\frac{8}{200}$			Capsule occluding pupil; has to be split.
	Two small, on inner side.	15	$\frac{20}{200}$	Disc. in five weeks.	$\frac{20}{30}$	
	Some, filiform.	14	$\frac{20}{100}$	Disc. in ten weeks.	$\frac{20}{40}$	
	Some, from injury.	23	$\frac{10}{200}$		$\frac{20}{40}$ in ten weeks.	

No.	Name.	Age.	Cataract.	Complication.	Date of operation.	Operation.	Reduction of Iris.	Healing process.
22	Schuhman.	65	Hard.	Dacryocystit. chronic.	18	Regular and very smooth and quick.	With spatula.	Two days without irritation. Wound united, clean; clear and central pupil. Patient restless, got up. Pain in third night. Infiltration of wound; panophthalmitis.
23	Schultz.	65	"		Dec. 22		With probe.	Patient restless the first day, pain in eye; pupil oval.
24	Pahud.	63	"		22	Patient pressed inordinately. A few drops of vitr. followed lens. Iris folded at periphery.	Stroked back only partially	Well the first three days. Then extensive traumatic hemorrhage by rubbing with hands, repeated three or four times in the course of two weeks in spite of all precaution.
25	Mrs. Smith.	35	Soft.	Diabetes.	Jan. 5, 1887	Regular.	With probe.	
26	H. Walt.	62	Hard.		12	"	Spont.	
27	C. Schlette.	60	"		17	Regular. Some flakes remained in pupillary area.	With probe.	No irritation.
28	McArth.	55	"	Dacryocystit. simplex.	22	Regular.	Spont.	
29	Harris.	33	Morgagn.		30	Nucleus expelled by rotating lower end up.	Spont.	Wounds open at bandaging for days. Iritis.

thence carried into the wards on a litter (Panas), or walked up stairs (DeWecker), or brought up in an elevator (Fieuzal). An operating-room which is used for nothing else and kept dust-free is, of course, preferable to a sick-room. Yet, when there are no other or only a few patients in a room, the air can be kept virtually free from pyogenic germs. It is now well known that infection from the air is the least to be dreaded. Of all the pathogenic germs, the pyogenic seem, however, to be the most extensively distributed in the air, at least they are the only pathogenic ones that have, thus far, been directly obtained in cultivations from the air.

The patients commonly received a bath the day before the operation, and their heads were washed with soap. When they were seated in the operating-chair, the eyes and surrounding parts were washed with soap, wiped dry,

Iris prolapse or incarceration.	Synechiæ.	Length of treatment.	Primary result.	After operation.	Final result.	Remarks.
Iris prolapsed on fourth day when wound had opened.		26	o			The dacryocystit. had been treated for four months, and seemed sufficiently improved to venture operation.
Iris incarcerated, not prolapsed.	No synechiæ. Pupil oval.	29	$\frac{20}{100}$		$\frac{20}{100}$ two months.	Marked astigm.
Upper part of iris drawn back.	Pupil irregular. No synechiæ.	38	$\frac{15}{200}$			Patient uncontrollable.
		15	$\frac{20}{70}$			
		11	$\frac{20}{70}$		$\frac{20}{40}$	
On second day prolapse of iris along the whole wound, covered with the conjunctival flap. Prolapse gradually disappeared leaving the whole wound free. Pupil oblong. Sphincter in eye.	No synechiæ.	17	$\frac{20}{100}$		in four weeks.	
	Small synechiæ above and below.		$\frac{20}{70}$	Disc. on eighteenth day.	$\frac{20}{40}$ $\frac{20}{30}$	

and then washed with corrosive sublimate $\frac{1}{2000}$, or Panas' solution of biniodide and alcohol, or carbolic acid $\frac{1}{50}$. Then Panas' solution was freely instilled into the conjunctival sac and over the cornea; the upper lid was turned, and its conjunctival surface (more particularly its free edge) carefully washed with absorbent cotton moistened with the biniodide solution.

A drop or two of a three-per-cent. or four-per-cent. solution of *muriate of cocaine* was now let fall on the cornea, followed by another drop or two six or seven minutes later. Then the biniodide was again instilled, and the operation begun. Ether was given in several cases; not in as many as might have been desired.

The instruments, of course, *had been previously cleansed and sterilized.* They were washed with soap, boiled water, and the

alcoholic solution of biniodide of mercury. For instruments with uneven surfaces—forceps and the like—a soap-brush was used; the others were rubbed with freshly washed linen. All were wiped dry, polished with the same kind of linen, and dipped in the biniodide solution immediately before being used, the liquid being left on them. Special care was taken in cleansing the cystitome, on account of its angles, from which it is more difficult to remove germs than from a straight, polished surface.

The *hands of the operator* and of his assistants were cleansed in the usual way with soap and bichloride of mercury.

2.—Mode of Operating.

The lids were kept open with a *wire speculum* provided with a screw.

The eyeball was steadied with the ordinary *fixing forceps* implanted in the conjunctiva close to the lower corneal margin. A *Graefe's knife* was then, rather quickly, passed through the anterior chamber, making a section through two fifths of the transparent corneal margin, or less, according to the size of the cataract.

If the eye is completely free from irritation, I avoid a *conjunctival flap* as a useless complication; but when there is chronic conjunctivitis or dacryocystitis, I consider a conjunctival flap of advantage. No doubt it increases the danger from primary infection by enlarging the wound, yet with antiseptics we can efficiently guard against the primary infection, but not so well against the secondary, from which the conjunctival flap is a protection. These views are derived from the series of operations under consideration, and they will be spoken of further on. The iris is best avoided by passing the knife *quickly* through the anterior chamber. In none of the cases of the present series did the iris fall before the blade of the knife, nor was it wounded in any way.

As soon as the section is completed, a *cystitome is introduced* and the capsule opened extensively in the centre, the manœuvre being completed with a horizontal stroke in the upper part. If the iris is not prolapsed, the point of the

cystitome may in the last stroke be passed underneath its upper part. In several cases pieces of capsule were drawn out with the forceps.

The *lens* is *now expelled* by pressing with a rubber spoon on the lower part of the cornea, as in Graefe's method, or by pressing on the cornea with the lower lid after the speculum has been removed. The latter mode is preferable in complicated cataracts, especially when the suspensory ligament is defective and the lens dislocated. In some cases, in this as in Graefe's method, when I saw that the upper end of the cataract or its nucleus did not present in the wound, but wedged itself into the periphery of the posterior chamber, I pressed it toward the centre of the globe with one hand, while pressure upon the lower part of the cornea with the other moved the lower edge of the cataract up and into the wound. Simultaneous pressure with both hands towards the centre of the eyeball expelled the lens gently and without accident. I am sure that I am not the only one acquainted with this mode of exit, but since I have seen some such cases do surprisingly well, I have studied and adopted it as a method for a certain group or cases.

The *removal of remnants* of lens is most important. Panas lays the greatest stress on this step. He says "the perfection of the result and the absence of operative complications depend chiefly on good cleaning of the pupillary space. Pressure with the fingers, pressure with the curette (he uses Daviel's spoon), repeated introduction of instruments into the anterior chamber—we spare neither time nor trouble to attain our object, and we succeed." One must have seen Prof. Panas do this to believe what an amount of interference eyes are capable of enduring without injury. He says "the antiseptic method has here, as in lithotrity, changed every thing, and nothing need be feared, provided the washing out of the anterior chamber (*le lavage intra-oculaire*) is made (as he does it) regularly." [1] I have endeavored to follow Panas' example, and yet have been cautious with regard to scooping the remnants out. I have preferred to let patients

[1] Bulletin de l'Académie de Médecine, Séance du 5 Janvier, 1886.

wait until their cataracts are completely ripe in order to avoid extra trouble in the removal of remnants. When the pupil was clear, the eye was closed for a short time to let the iris resume its natural position. This occurred spontaneously in seventeen out of the twenty-nine cases (fifty-nine per cent.). In the others the iris was reduced by rubbing the cornea with the lids or stroking with a probe the folded iris out of the wound and the sinus of the anterior chamber back into its normal position. If, in spite of my efforts, the pupil was not central and round, I made an iridectomy on the spot.

Particles of lens, blood, etc., during the operation were wiped away with absorbent cotton dipped in the alcoholic solution of biniodide of mercury.

The last part of the operation was the *washing out of the anterior chamber*. After the speculum had been removed, the upper lid was held up with the forefinger of my left hand, the patient was directed to look downward, the nozzle of an E. Meyer's lachrymal syringe—which was used for no other purpose—was introduced into the wound, and a few drops of the biniodide solution thrown into the anterior chamber, the nozzle of the syringe passing along the section so as to moisten the wound with the antiseptic from one end to the other. I have avoided injecting large quantities of liquid into the eye, my object being to sterilize the region of the wound, not to kill germs nor to cleanse the pupil by the stream of liquid. When the operation had been quickly performed, and no instruments except the knife and cystitome introduced, I limited the injection to the lips of the wound, and in a few cases did not use the syringe at all, but dropped the antiseptic over the wound with an ordinary atropine dropper. There are no germs within the eye, and the few that may possibly be introduced with the instruments from the conjunctiva are not likely to multiply in an eye that has been operated on smoothly and cautiously. It is a different thing if the cornea and iris are bruised by the pressing of a large lens through an insufficient wound, and if the capsule has been indiscriminately lacerated, especially if particles of cataract and shreds of

iris and capsule remain in the section. These conditions prepare the soil for the multiplication of bacteria, and demand the use of efficient antiseptics. In such a case I would irrigate the conjunctival sac and syringe out the anterior chamber freely with the alcoholic biniodide or a watery bichloride (1 : 5000) solution.

When the operation was finished, I instilled two drops of a one-per-cent. solution of sulphate of eserine. Of late, I have also put a small quantity of eserine ointment (0.10 to 10.00 of vaseline) into the conjunctival sac. The closed eyelids were covered with a compress of linen gauze, which was smeared with an ointment consisting of 0.15 of benzoate of mercury to 10.00 of vaseline cold cream. A pad of absorbent cotton steeped in the biniodide solution was spread over the gauze, so as to form a mould over the eyelids ; then dry absorbent cotton was placed on the wet cotton and on the lids of the other eye, both held in position by a flannel roller applied in the manner of the old binoculus bandage, which, in my opinion, still remains unexcelled.

3.—After-treatment.

The patients were *put to bed* with as little disturbance as possible, and requested to lie on their backs as quiet as they could. They sat up in bed while taking their meals, and got out of it to satisfy calls of nature. *Rest* is considered to be of the greatest importance, not only as favoring primary union in general, but more especially in this method of extraction, in order to prevent prolapse of iris. To darken the room is by no means necessary, and never has been, for the bandage is a sufficient protection from too bright a light.

The *next day* the dressing is renewed without opening the eye, except when there is inflammation. In most cases there is a small quantity of mucus on the gauze, probably conjunctival epithelium necrosed by the action of the antiseptic. If otherwise the gauze is dry, the new bandage is left undisturbed for two days. Then the eye is opened and inspected. If the pupil is round and central and no irritation present, the eye is cleansed and bandaged again without any instillations. If the pupil is oblong, eserine solution

is instilled, and eserine salve put in the conjunctival sac; if the pupil is round and central, the wound closed, but circumcorneal injection or some pain is present, atropine is instilled. I am inclined to use atropine earlier and more frequently than is recommended in the simple extraction. Wherever shreds of lacerated capsule come in contact with the pupillary edge of the iris, synechiæ are apt to develop. In the present series there were synechiæ in ten cases out of twenty-nine; in no case were they extensive, nor did they lead to the formation of a dense pupillary membrane, yet many of them might have been ruptured had I instilled atropia earlier.

Of the *accidents* occurring during the operation, two cases of escape of vitreous are to be noted (Nos. 14 and 24). In both a few drops followed the exit of the lens. The iris lay folded in the upper part of the anterior chamber, and it was impossible to reduce it either by rubbing or the probe. The wounds united well, without prolapse or incarceration.

4.—Wound Complications.

There were two cases of *incarceration of the iris* (Nos. 10 and 23).

The *first* was in an exceedingly nervous man with a hypermature cataract, the removal of which had been very laborious. The pupil, at the end of the operation, had been completely round. Two days later, when the eye was opened, a considerable portion of the iris lay in the wound without protruding. It was covered by a conjunctival flap. The anterior chamber was restored. There was plastic iritis, but no suppuration, though the patient suffered from chronic dacryocystitis. The wound closed completely, no iris was seen lying in the outer layer of the wound. Four months after the operation S $\frac{2}{4}\frac{0}{0}$ was raised to $\frac{2}{5}\frac{0}{0}$ by a discission.

The *second* case was the man spoken of previously as having been operated on in the operating-room, and led up one flight of stairs. He was restless for the first twenty four hours and had some pain in the eye, but when he lay quiet, after having been told that rest was of the greatest importance, the pain disappeared and the recovery henceforth was undisturbed. S $\frac{2}{1}\frac{0}{0}\frac{0}{0}$, two months after the operation, with marked astigmatism.

There were four cases of *prolapse of iris* occurring within the first three days after the operation.

In case No. 22 the iris was seen lying in the centre of the corneal wound, suppuration being fully developed.

In the case of puriform inflammation (No. 17) the iris was noticed in the centre of the section. It disappeared from view when the inflammation subsided. The pupil was drawn up, the whole sphincter being in the anterior chamber.

The third case referred to an old man, who in his sleep used to throw himself about in spasmodic fits. His was the only case in which the prolapse remained ; the recovery being slow but free from inflammation, and the pupil perfectly clear, though drawn up.

In the fourth case (No 27) the iris protruded beyond the corneal wound in its whole extent, but was covered with a conjunctival flap. During the recovery, which was quick and undisturbed, the whole iris disappeared from the outer aspect of the wound. The pupil was oblong, the sphincter completely in the eye ; no synechiæ.

In former times I was in the habit of abscising all traumatic prolapses of iris. Of late I have become more conservative with regard to this point. I noticed that prolapses left to themselves mostly disappeared or cicatrized in a surprisingly smooth manner, and it seemed to me that they gave rise to sympathetic trouble less often than when I had abscised them. If I get the cases early, before adhesions with the cornea have formed, I remove the prolapsed iris and stroke the rest back into the anterior chamber, *i. e.*, I make a clean iridectomy. Prolapses from ulcers or wounds that are suppurating I never cut. The iris is a barrier against the entrance of the germs into the interior of the eye, a fact which not only is clinically well known, but which I saw verified by experiments on rabbits in which the uncut iris showed itself very resistant to the action of pyogenic bacteria.

The *healing process* was, on the whole, satisfactory. The two cases of suppurative inflammation, of which the one ended in recovery, the other in loss of the eye, were owing to individual complications, not to the method.

Posterior synechiæ were left in ten cases, but they were not extensive.

More or less *pupillary obstruction* from the lens capsule required *discission* in six cases; in three others it has to be done now, and probably in some others later.

Traumatic after-hemorrhage (No. 24) occurred in a patient who, with the best will, could not control his hands during his sleep nor avoid hurting his eye against the bedding or the wall. He was a stout asthmatic man, who would throw himself about in spite of all precaution and restraint. The blood totally filled the anterior chamber and hung out of the wound in clots. The hemorrhage occurred in a less degree four other times. The blood was absorbed and left a good eye.

Plastic capsulitis with congestion of the iris and ciliary body occurred in one case (No. 18), which was rather remarkable. From the centre of the pupil a shred of capsule passed over the anterior surface of the iris to the inner corner of the wound. It kept up an irritation and I was tempted to open the wound and extract it with a pair of forceps, for I feared that it might be the carrier of infection, the patient suffering from chronic dacryocystitis. When the irritation set in the wound was already perfectly closed, and there seemed to be no longer any communication with the conjunctival sac, if indeed it had ever existed. Under atropine, leeches, and rest I noticed that the shred became smaller and finally disappeared. In the pupil there is now a somewhat dense capsule, which can be split with a knife-needle.

The case of *puriform kerato-iritis* (No. 17) presented a good deal of interest. The cataract was white, not gray. The field of vision was contracted in its lower part. Prognosis unfavorable, but, as the other eye had an immature cataract of the same nature, I advised an operation. When the capsule was opened milky cortex overflowed the anterior chamber. The nucleus came out in pieces. The pupil was clear and central after the iris had been stroked back. When the antiseptic was injected into the anterior chamber the patient made a sudden start, which was followed by prolapse of the iris, and she kept up such a constant motion of the eye that I was unable either to stroke the iris back or to cut it off. I therefore anæsthetized her with ether, reduced the iris, and injected the antiseptic. The pupil was clear, round,

and central. The next day the gauze was moist. On the fourth day the edges of the wound were whitish, the cornea hazy, the anterior chamber dull; a small portion of iris lay in the wound. By cleansing the wound and washing the conjunctival sac out three times daily the inflammation gradually subsided. The pupil was drawn up, but the wound was normal. No sloughing of the cornea, no retraction of the scar, no diminution of the size and tension of the globe had taken place. Sight has improved up to about $\frac{10}{200}$, and promises to be further improved by a discission.

I would say that the inflammation in this case had not been purulent, but lymphatic, had not cultivations from the wound secretion given us a well-characterized growth of staphylococcus pyogenes. Evidently, infection of the wound had taken place, but the inflammation was not intense enough to destroy the eye.

The case of *panophthalmitis* (No. 22) teaches a lesson which is not new. I treated the conjunctivitis and dacryocystitis for months, and did not operate till the discharge had ceased. Yet the conjunctiva was still red and somewhat swollen. Operation regular. Antiseptic precautions rigorous. No reaction for two days. Wound closed, clean; anterior chamber, iris, pupil, and sight normal. Then patient got up in the night, sought for his purse in the dark, and went about as if he were well. Toward morning pain set in; in the afternoon I found the edge of the wound infiltrated. The upshot was panophthalmitis.

Two things might, and probably would, have averted this issue: (1) If the patient had continued to be quiet, the wound would probably not have been irritated and infected, as its aspect had previously been excellent. (2) If I had made a conjunctival flap it would probably have prevented the germs from invading the corneal wound on the third day.

In all cases of conjunctivitis and dacryocystitis I shall henceforth—unless my views change—make a conjunctival flap. The conjunctival flap does not obviate, it perhaps favors, primary infection—*i.e.*, infection during the operation. But against this we may protect our patient by scrupulous asepsis and antisepsis. Sterilizing the conjunctival and lachrymal sacs before the operation, irrigating the wound during the operation, and sterilizing the anterior chamber

and the conjunctiva after it, will prevent primary affection, as it did in the case under consideration. When the eye has to be kept bandaged for a few days, the bacteria, multiplying in the conjunctival sac, may come in contact with the edge of the conjunctival wound, where, as experiments demonstrate, they do no harm, but the conjunctival flap, the inner surface of which is united to the underlying tissue, prevents them from reaching the edge of the corneal wound. If the lips of the wound do not apply accurately, but, as frequently occurs, the corneal lip projects somewhat over the scleral, bacteria will have easier access, and, if the patient be restless and move his eye, they are directly stroked into the wound, the wound is not only more efficiently inoculated, but the abundant tissue juice, poured out from its irritated lips, furnishes an appropriate nutriment for the microbes.

The safest treatment in dacryocystitis is, of course, to destroy the sac, postponing the operation until the conjunctiva has become white.

5.—Results.

The *visual acuteness* obtained has been as follows:

S.	No. of cases.	S.	No. of cases.
$\frac{20}{30}$	2	$\frac{20}{200}$	1
$\frac{20}{30}$	3	$\frac{15}{200}$	1
$\frac{20}{40}$	4	$\frac{10}{200}$	1
$\frac{20}{50}$	3	$\frac{8}{200}$	1
$\frac{20}{70}$	5	$\frac{6}{200}$	1
$\frac{20}{100}$	6	0	1

If with regard to the perfection of the operative results, we call those cases ideal recoveries in which the pupillary area is not obstructed by inflammatory products, the pupil is central and movable, even if a few filiform adhesions are present, we have obtained *eighteen perfect or ideal recoveries among twenty-nine cases—i.e.*, 66 %.

There was one case of loss. All the imperfections in the healing process that have been noted can be called unimportant; namely, a few cases of oval or displaced pupil,

and three cases in which the capsular obstruction was made somewhat denser by inflammatory products, yet not so much as to require any other after-operation than a simple discission with a knife-needle.

6.—Comparison of the Two Methods.

If we compare the simple extraction with the extraction combined with iridectomy, we find as **advantages** of the former the following:

1. It preserves the natural appearance of the eye.
2. The acuteness of vision, other things being equal, is greater.
3. Eccentric vision and "orientation" (correct localization of objects in the visual field) are much better, adding a great deal to the comfort and safety of the patient.
4. Parts in direct connection with the ciliary body, such as shreds of the capsule and iris, are not so liable to be locked up in the wound and thus transmit morbid conditions to the most vulnerable part of the eye, the ciliary body.
5. It may not necessitate so many after-operations.

As **disadvantages** may be mentioned:

1. The technique of the operation is more difficult in all its parts: (*a*) The section must be larger, to let the lens pass through an aperture, the size of which is diminished by the iris lying in it; it must be more accurate to secure coaptation, and it must be more rapidly performed in order to prevent the iris from falling before the knife. (*b*) The opening of the capsule requires a deeper introduction of the cystitome into the anterior chamber. (*c*) The expulsion of the lens is more difficult, and (*d*) the cleansing of the pupillary area is much more troublesome than in the combined extraction.
2. Prolapse of iris and posterior synechiæ are more numerous.
3. It requires a quieter and more manageable patient during and after the operation than is needed in the combined extraction.
4. It is not applicable to all patients, whereas combined extraction can be used as a general method.

7.—Indications for the Iridectomy.

This brings me to the last point which I want to consider, namely, *when should an iridectomy* be made.

1. When in case of fluidity of the vitreous and rupture of the suspensory ligament of the lens, the cataract on pressure does not present in the wound, but only vitreous escapes.

This occurred in the case of Mr. E. S. R., æt. sixty-five, operated on Oct. 11, 1886. After a regular corneal section, fluid vitreous escaped. When the cystitome was pressed on the capsule, the lens receded. The speculum was removed, and an unsuccessful attempt made to expel the lens by pressure through the lids. A further escape of vitreous was the only consequence. The speculum was reinserted, a small piece of iris exsected, the speculum removed, and the lens in its capsule pressed out with the lids, without further loss of vitreous. Recovery undisturbed. Sight good.

2. When the section is insufficient and the iris, in the attempt to expel the lens, has been pushed into the wound, and vitreous presents or escapes.

This happened in the first patient on whom I tried the method. The exsection of the protruding iris made the completion of the operation easy. Result good.

3. When during the operation the iris has been bruised or injured.

This happened in the case of Brother C., æt. sixty-seven, who had a hypermature cataract. During a tedious attempt to extract the thickened centre of the anterior capsule with a pair of forceps, the iris was caught between the branches, and so much bruised that I thought it advisable to exsect the injured portion. After this was done the lens came out easily, and the whole capsule was then extracted without an effort. Recovery and result good.

4. When the sphincter is unyielding, more especially when a peripheric piece of iris falling before the knife has been exsected. I would rather cut a rigid sphincter than expose the patient to prolapse of vitreous in the attempt to overcome its contraction by undue pressure.[1]

5. When the iris, after the expulsion of the lens and cleansing of the pupillary field, proves irreducible.

[1] I successfully acted on this principle in a case operated on, Feb. 27, 1887.

This happened in three patients, all of whom, after the iridectomy, made a good recovery. I include in this category all cases in which the pupil does not become perfectly central and round. They indicate lack of elasticity of the iris tissue, and are not to be trusted, though in some of them the paralysis of the sphincter may be transient. It is better to exsect a piece of iris on the spot than to run the risk of a subsequent prolapse. When a prolapse is found on the second day, it may or may not be cut, but after the second day it is advisable, I think, not to touch it. The experience in the series under consideration has been in favor of leaving it alone.

To conclude, I may be allowed to **express my opinion on the value of the method** of extraction without iridectomy, as follows:

Simple extraction is an operation of the highest order, and practicable in the majority of cases with the same degree of safety as the extraction combined with iridectomy. In a considerable minority, however, the latter method is preferable; in a number of cases the indications for the iridectomy manifest themselves before, in others only during, the operation.

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